

BIOCHEMICAL AND THERAPEUTIC STUDIES ON POSTPARTUM INDIGESTION (PPI) IN BUFFALOES



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INTRODUCTION

- **Buffalo Population (FAO, 2008):**
 - **World 185.29 millions**
 - **India 105.10 millions (57%)**
 - **Telangana 4.19 millions (2012) (4%)**
- **Milk Production (GOI 2011-12):**
 - **India: Total Milk 127.90 Mill Tons**
Buffaloes 65.35 Mill Tons (51%)



INTRODUCTION

- **Objectives:**

1. To study the incidence of PPI in buffaloes associated with hepatic insufficiency and production diseases.
2. To conduct a detailed clinical examination of cases of PPI (i.e., 0-2 months after calving).
3. To study the involvement of liver in PPI with the help of biochemical indices.
4. To study the association of PPI with subclinical forms of hypocalcaemia and ketosis.
5. To evolve suitable therapeutic and prophylactic measures for their prevention.

MATERIALS AND METHODS

- Selection of animals
- Clinical Examination
- Collection of materials
 - Urine – Sulkowitch, Ross modified Rothera's and Wallace-diamond Tests.
 - Blood and serum – Glucose, Calcium, Phosphorous, Magnesium, Total Bilirubin, AST, GGT, Total Protein and Albumin
 - Milk - Ross modified Rothera's Test
 - Rumen Liquor – pH, Colour, Odour, Consistency and SAT; MBRT, Microbial alterations.



- **Based on Urinalysis following groups were made,**

- ✓ Group I: Healthy animals
- ✓ Group II: a. PPI + subclinical hypocalcaemia
b. PPI + subclinical ketosis
- ✓ Group III: PPI + hepatic involvement
- ✓ Group IV: a. PPI + hepatic involvement +
subclinical hypocalcaemia.
b. PPI + hepatic involvement +
subclinical ketosis
- ✓ Group V: PPI alone

- **Therapy**

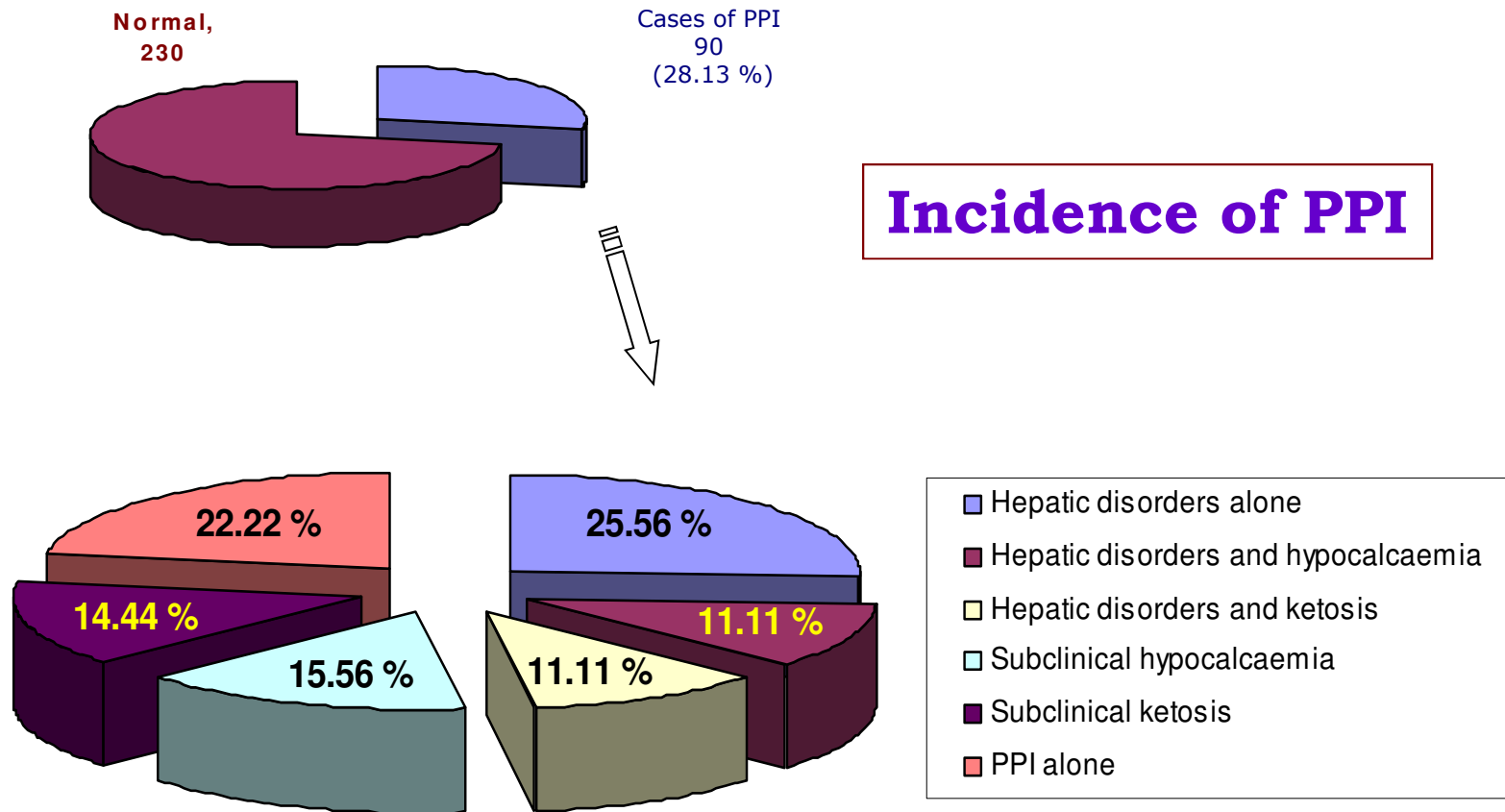
IIa ₁	Calboral 450 ml i/v for 2 days.
IIa ₂	Calup Gel 300 g P.O for 2 days.
IIb ₁	Inj. Rintose @ 0.5 g/Kg b wt i/v for 2 days and Inj. Laurabolin 100 mg i/m single dose.
IIb ₂	Inj. Rintose @ 0.5 g/Kg b wt i/v for 2 days and Ketonex Boli 4 per day for 3 days P.O.

- **Therapy**

IIIa	Inj. Rintose @ 0.5 g/Kg b wt i/v for one day and Inj. Livadex Forte 10 ml i/m for 3 days.
IIIb	Inj. Rintose @ 0.5 g/Kg b wt i/v for one day and Inj. Toxol 10 ml i/m for 3 days.
IVa	Inj. Rintose @ 0.5 g/Kg b wt i/v and Inj. Tribivet 10 ml i/m for 3 days, and Calup Gel 300 g P.O for 2 days.
IVb	Inj. Rintose @ 0.5 g/Kg b wt i/v for 3 days, Inj. Laurabolin 100 mg i/m single dose and Bolus Zigbo 2 boli for 5 days orally.
Va	Inj. Rintose @ 0.5 g/Kg b wt i/v, Inj. Anistamin 10 ml i/m for one day and Bolus Ecotas 2 per day for 4 days P.O.
Vb	Inj. Rintose @ 0.5 g/Kg b wt i/v, Inj. Anistamin 10 ml i/m for one day and Bolus Rumentas 4 per day (2 boli b.i.d) for 3 days P.O.

RESULTS & DISCUSSION

- Period of study - 17 months



Incidence of PPI

S. No.	Item	No. of buffaloes	Incidence (%)
1	Hepatic disorders	43	47.78
	i. Hepatic disorders alone	23	25.56
	ii. Hepatic disorders and production diseases	20	22.22
	a. Hepatic disorders and hypocalcaemia	10	11.11
	b. Hepatic disorders and ketosis	10	11.11
2	Production diseases	27	30.00
	i. Sub clinical hypocalcaemia	14	15.56
	ii. Sub-clinical ketosis	13	14.44
3	PPI alone	20	22.22
	Total	90	100.00

- **CLINICAL SIGNS**

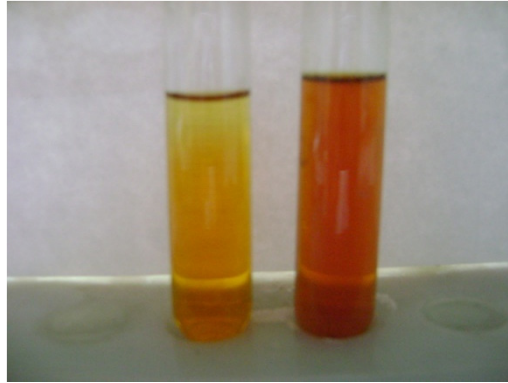
- **Decreased appetite**

- **Reduction in milk yield.**

- **Temperature, Pulse and Respirations were normal.**

- **Decreased Ruminant motility.**

URINE ANALYSIS:



Wallace-Diamond Test

**Ross modified
Rothera's Test**



**Sulkowitch
Test**

URINE ANALYSIS:

S. No	Parameter	Groups									
		IIa ₁	IIa ₂	IIb ₁	IIb ₂	IIIa	IIIb	IV _a	IVb	Va	Vb
1	Calcium										
	Before treatment	L	L	N	N	N	N	L	N	N	N
	After treatment	N	N	N	N	N	N	N	N	N	N
2	Ketone bodies										
	Before treatment	-ve	-ve	+ to ++	+ to ++	-ve	-ve	-ve	+ to ++	-ve	-ve
	After treatment	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
3	Bile pigments										
	Before treatment	PLR	PLR	PLR	PLR	CR	CR	CR	CR	PLR	PLR
	After treatment	PLR	PLR	PLR	PLR	PLR	PLR	PLR	PLR	PLR	PLR

L = Low

N = Normal

-ve = Negative

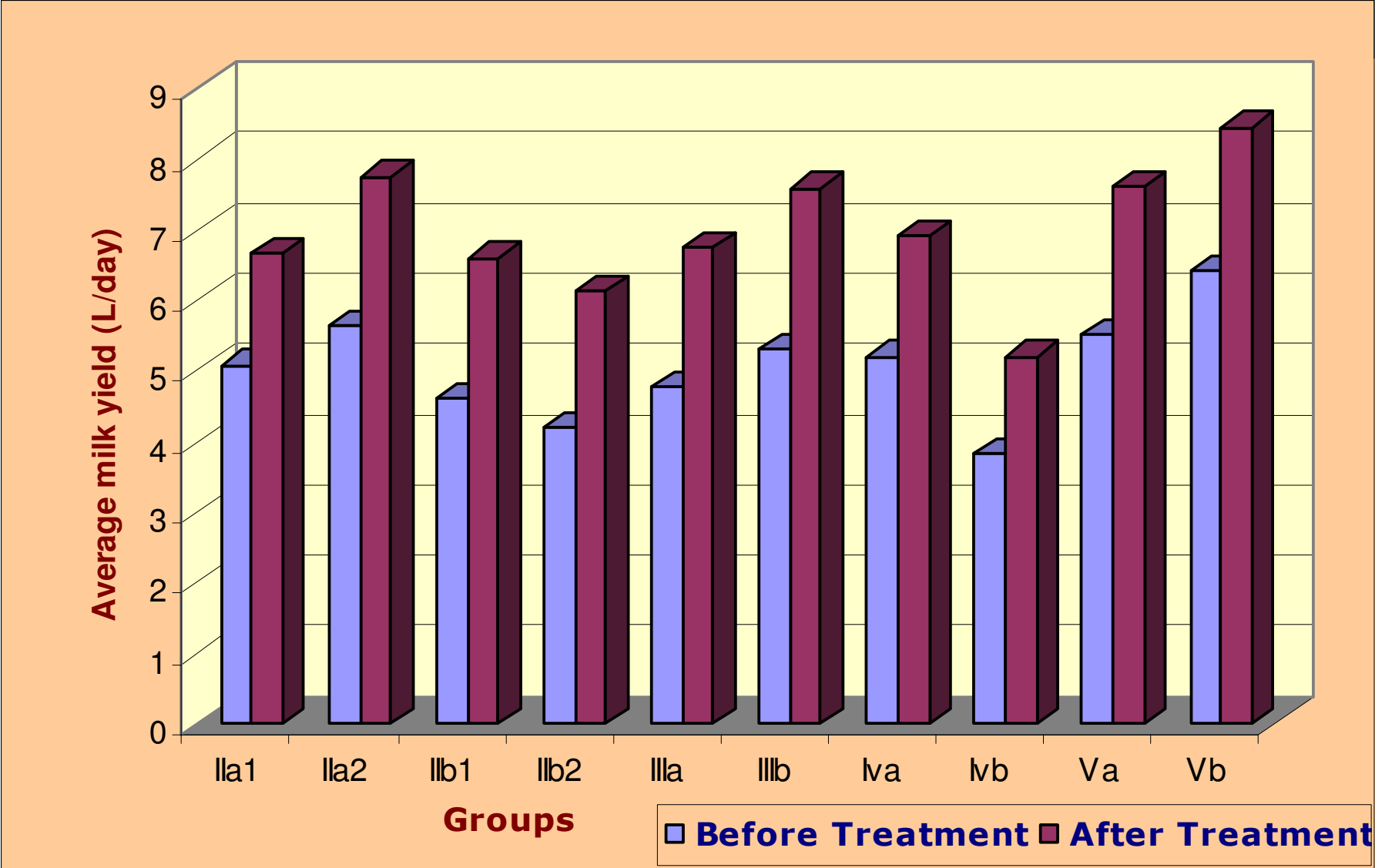
PLR = Pink to Light Red

CR = Cherry Red

REDUCTION (%) IN MILK YIELD OF PPI BUFFALOES

S. No.	Groups	Average milk yield (L/day)	Milk Yield (L/day) prior	Reduction (%)
1	Hepatic disorders and production diseases	8.70+0.51	4.51+0.57	48.13
2	Subclinical Ketosis	8.08+0.46	4.35+0.50	46.19
3	Hepatic disorders alone	8.91+0.42	5.04+0.34	43.41
4	Subclinical Hypocalcaemia	9.36+0.36	5.39+0.58	42.37
5	PPI alone	8.95+0.30	5.95+0.34	33.52

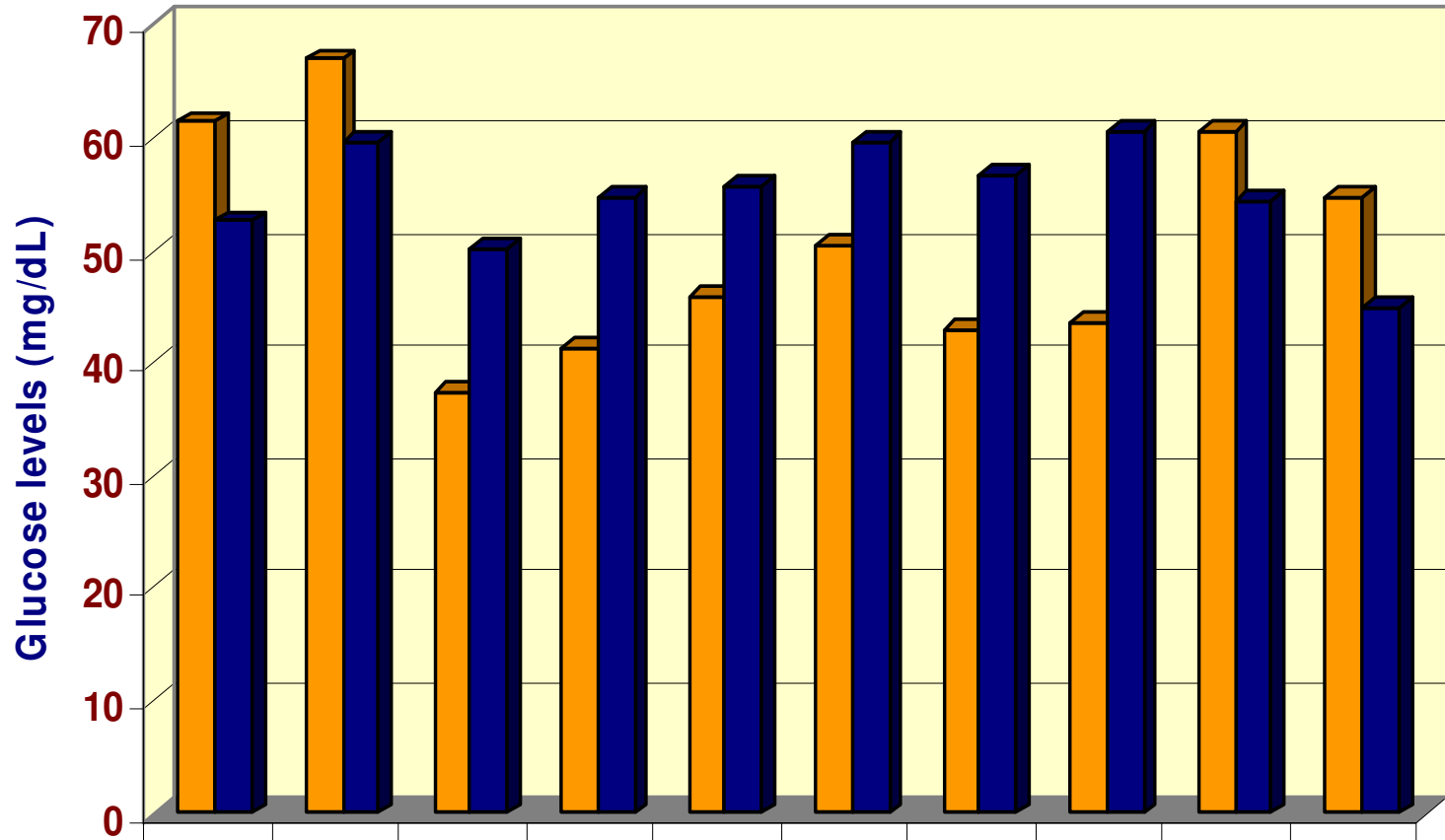
Average milk yield (L/day) before and after therapy



Mean Serum parameters of Group I (Healthy) animals

S. No	Glucose mg/dL	Calcium mg/dL	Phosphorous mg/Dl	Magnesium mg/dL	Total Bilirubin mg/dL	Cholesterol mg/dL	AST U/L	GGT U/L	Total protein g/dL	Albumin g/dL
1	53.05	9.41	4.32	2.10	0.27	58	89.00	43.20	6.3	2.69
2	59.06	9.12	5.26	2.20	0.18	128	89.00	24.81	7.9	2.53
3	55.66	8.63	4.60	2.24	0.25	139	127.80	49.97	7.2	2.78
4	50.29	9.15	4.75	2.32	0.45	90	130.40	27.94	6.4	2.62
5	58.26	8.49	5.32	2.31	0.23	121	117.01	43.00	6.8	2.39
6	57.08	9.21	4.96	2.24	0.49	103	119.01	25.09	6.8	2.57
7	55.09	8.79	6.08	2.31	0.35	107	114.01	44.23	6.6	2.69
8	52.05	9.13	5.21	2.41	0.36	118	119.46	38.96	6.4	2.73
9	58.91	9.46	5.38	2.44	0.37	122	118.32	44.32	6.3	2.84
10	50.28	8.93	4.91	2.56	0.25	131	113.04	29.81	6.4	2.92
Mean± SE	54.97 ± 1.08	9.03 ± 0.10	5.08 ± 0.15	2.31 ± 0.04	0.32 ± 0.03	111.70 ± 7.50	113.7 ± 4.46	37.13 ± 2.94	6.71 ± 0.16	2.68 ± 0.05

Mean Serum Glucose levels (mg/dL)



■ Before treat	61.51	67.08	37.43	41.35	45.98	50.53	42.98	43.79	60.77	54.77
■ After treat	52.68	59.71	50.18	54.73	55.87	59.73	56.75	60.62	54.42	44.97

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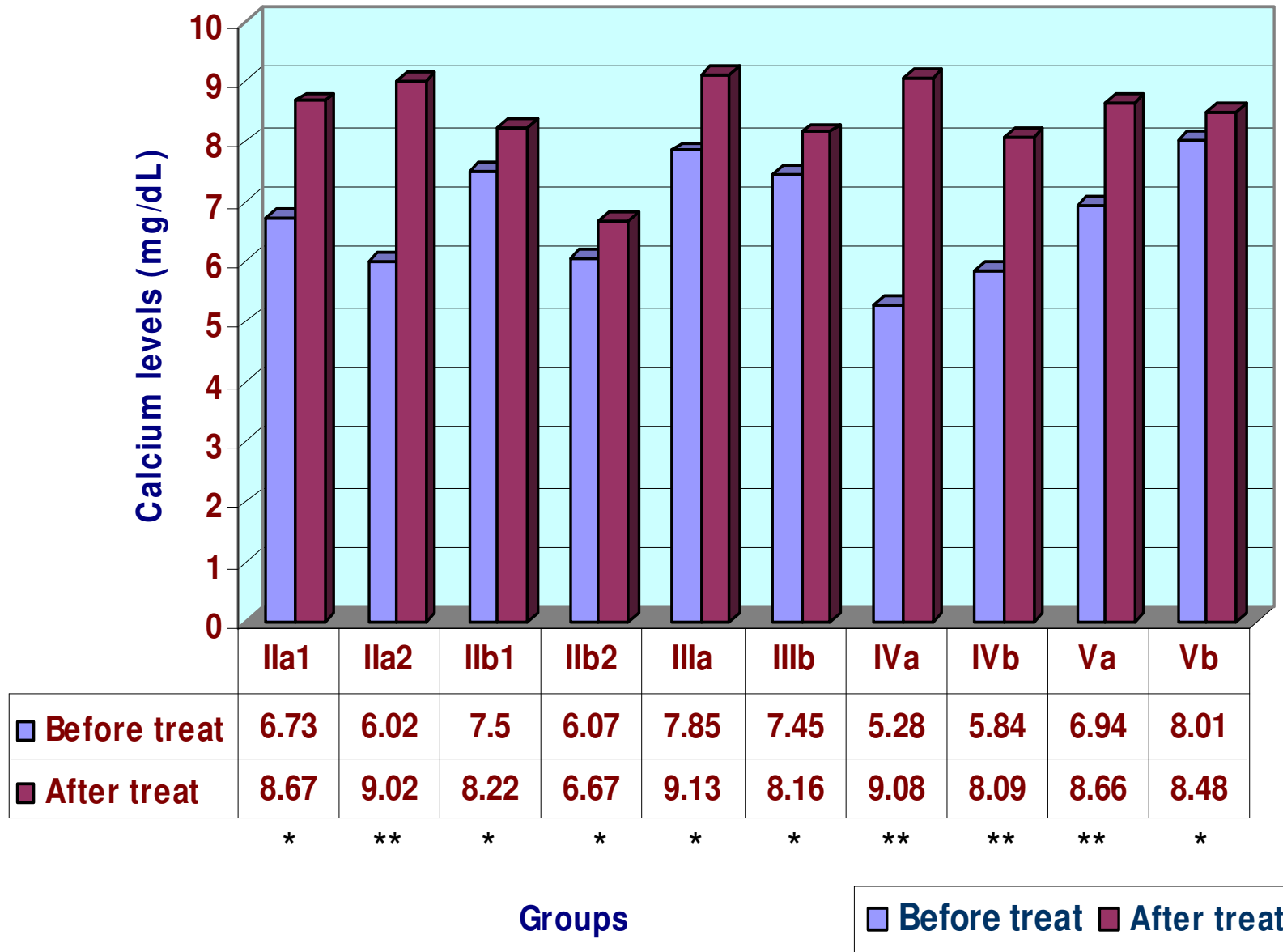
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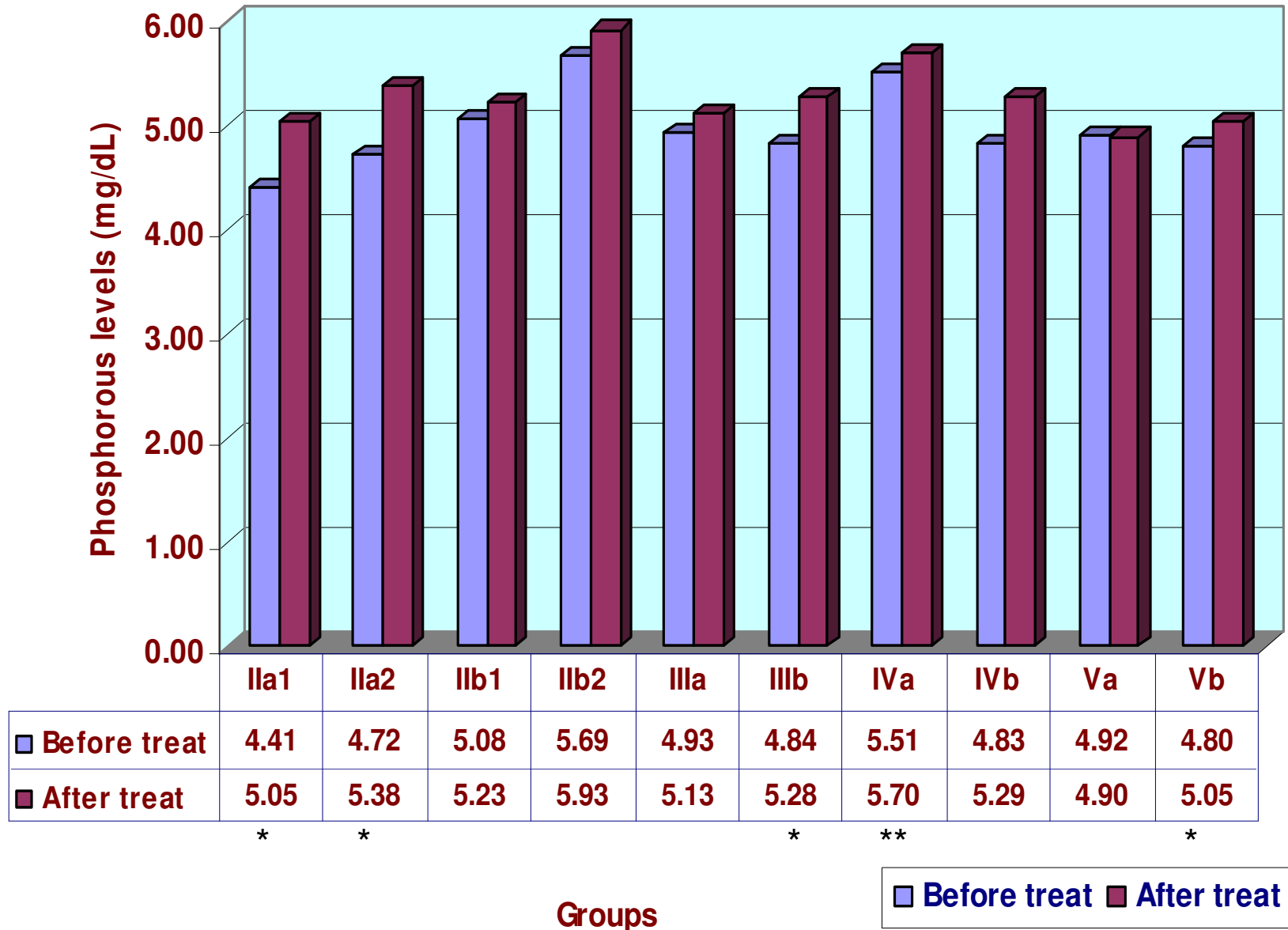
Groups

■ Before treat ■ After treat

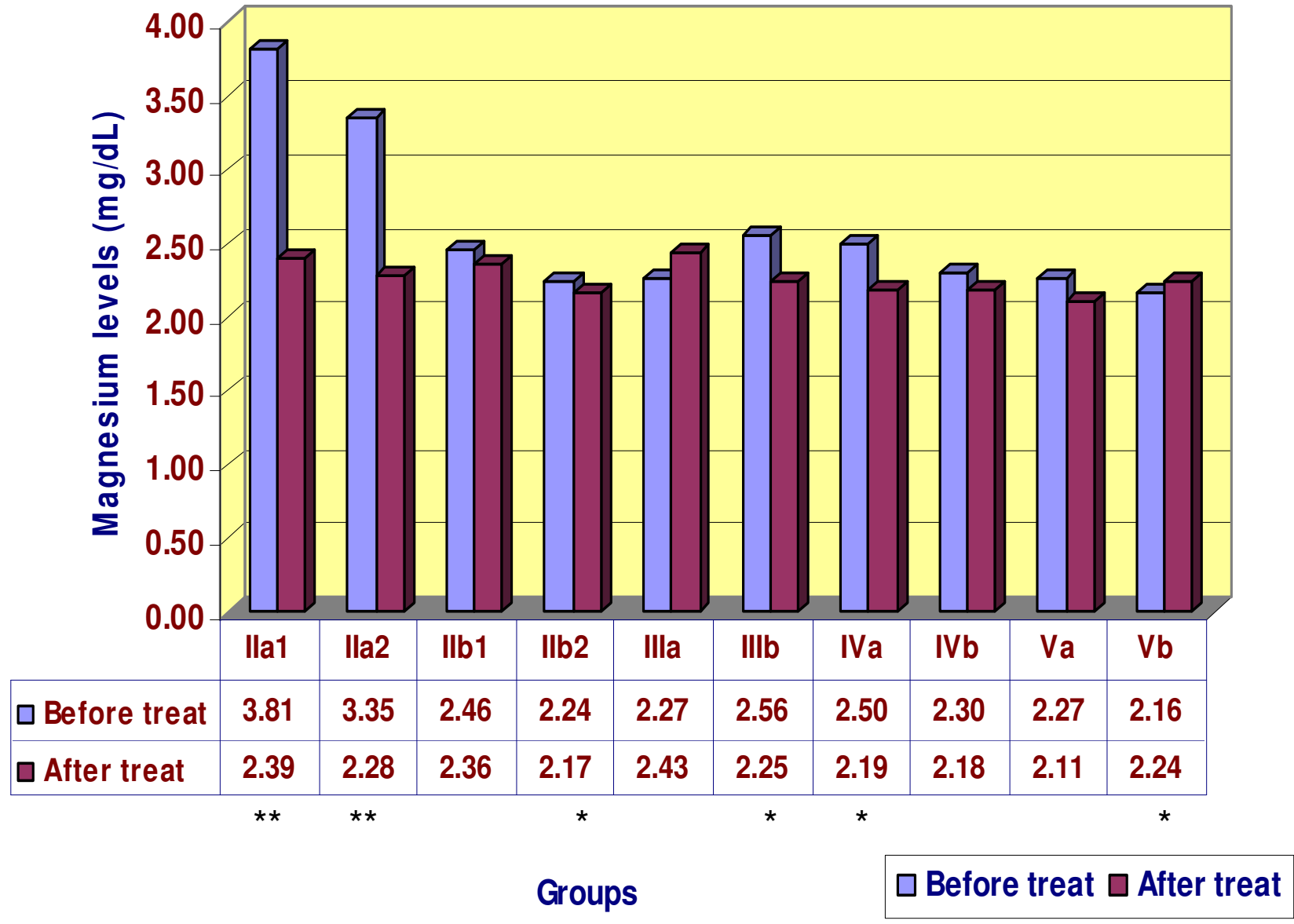
Mean serum Calcium levels (mg/dL)



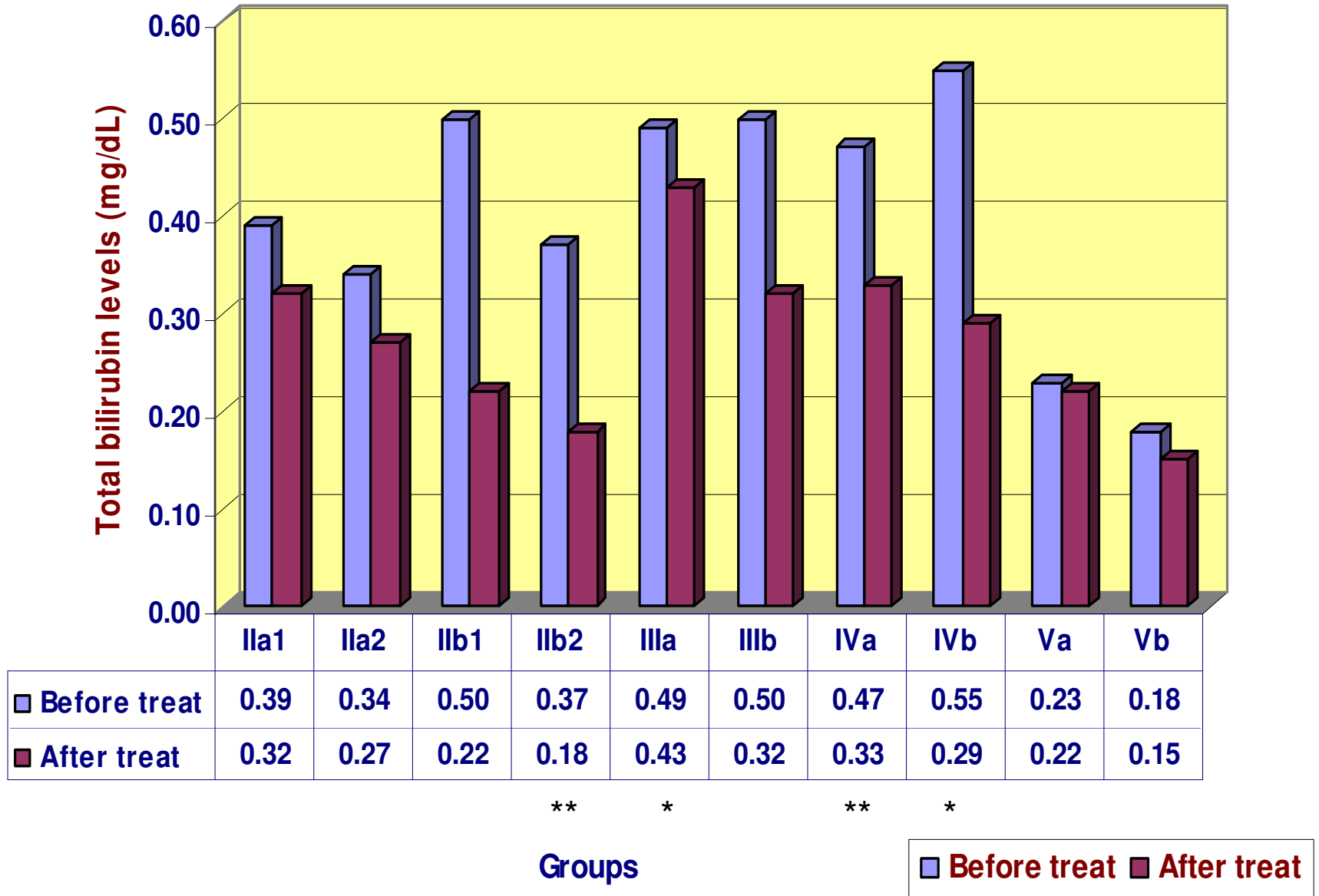
Mean serum Phosphorous levels (mg/dL)



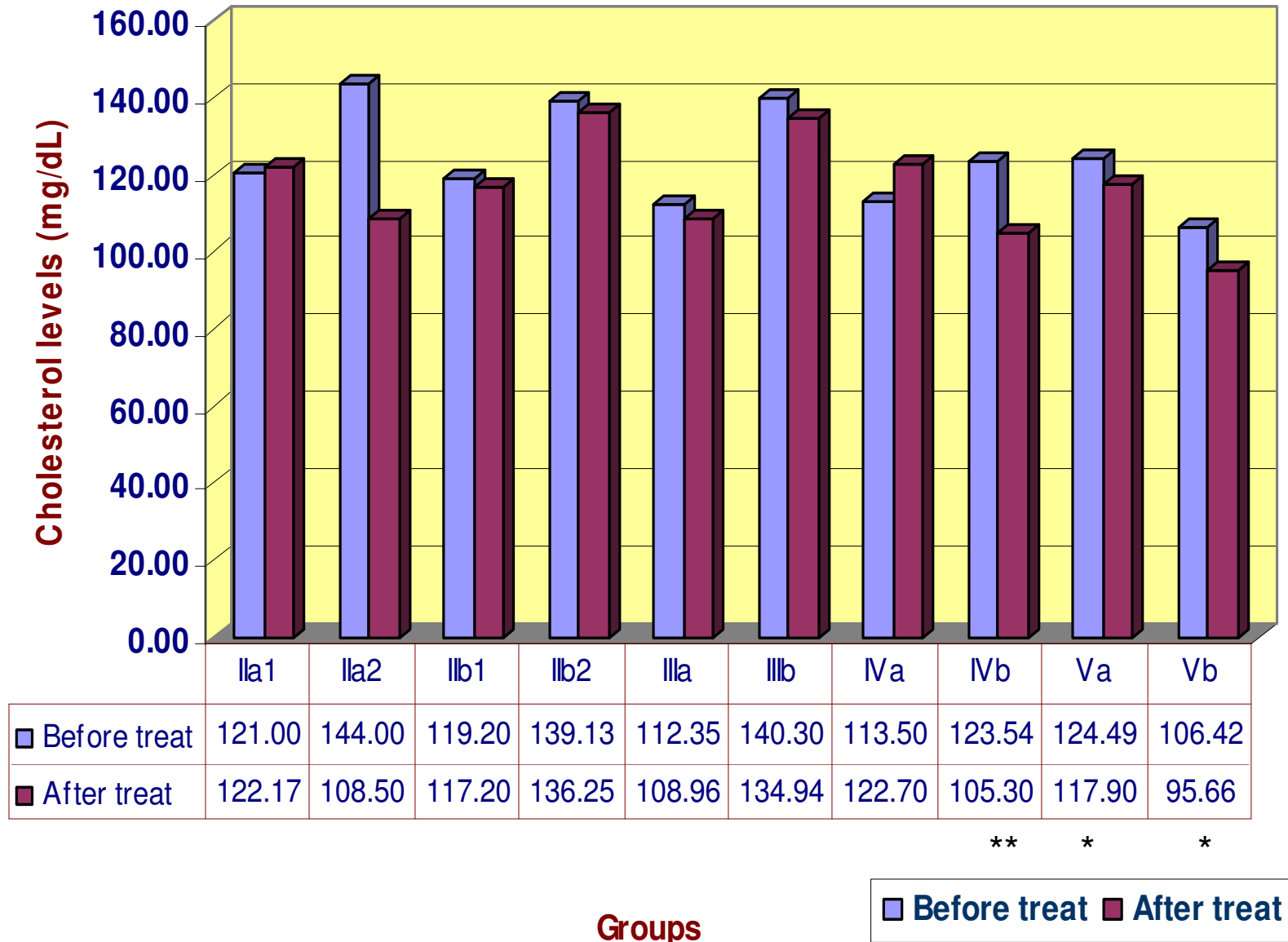
Mean serum Magnesium levels (mg/dL)



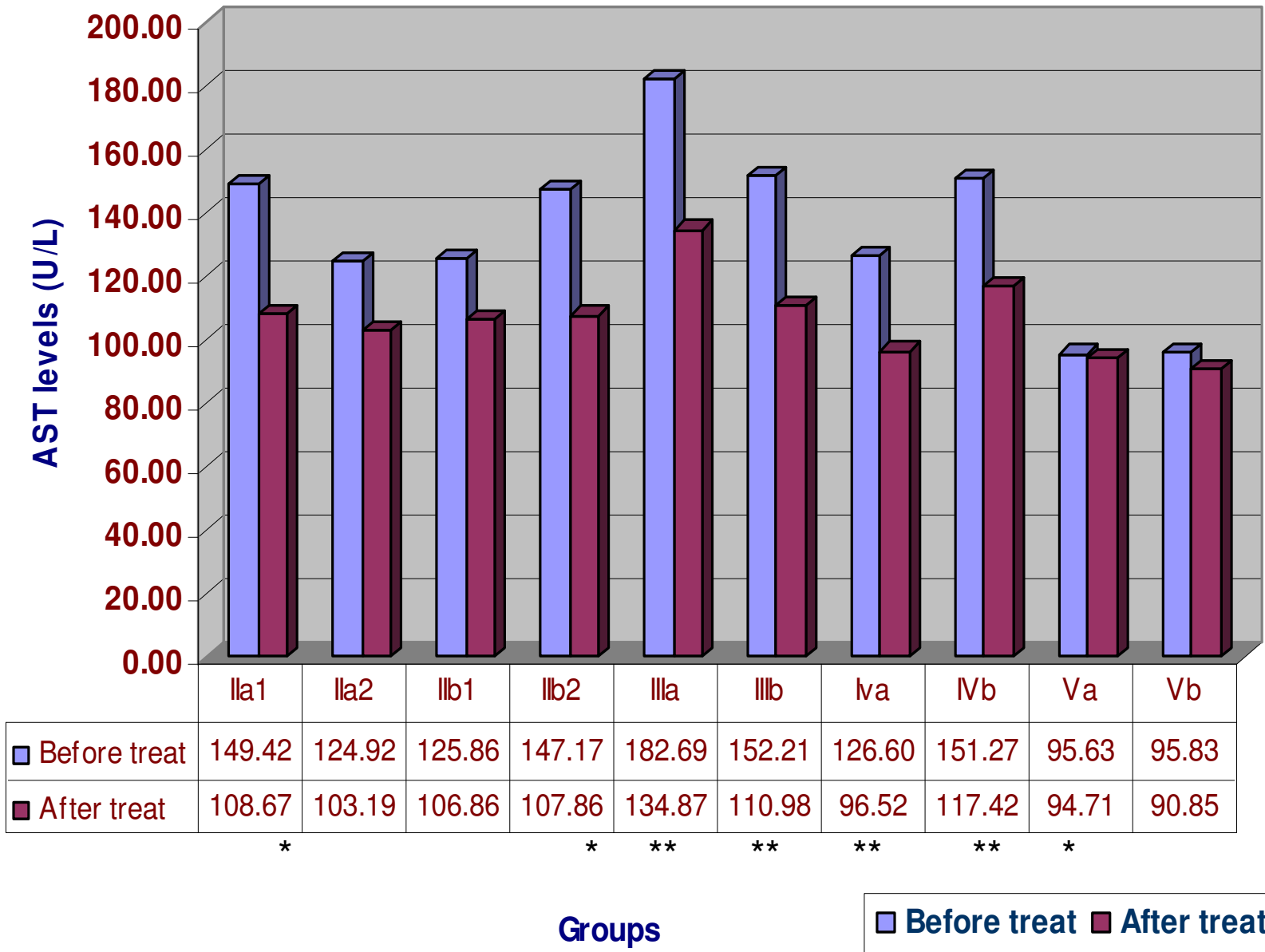
Mean serum Total bilirubin levels (mg/dL)



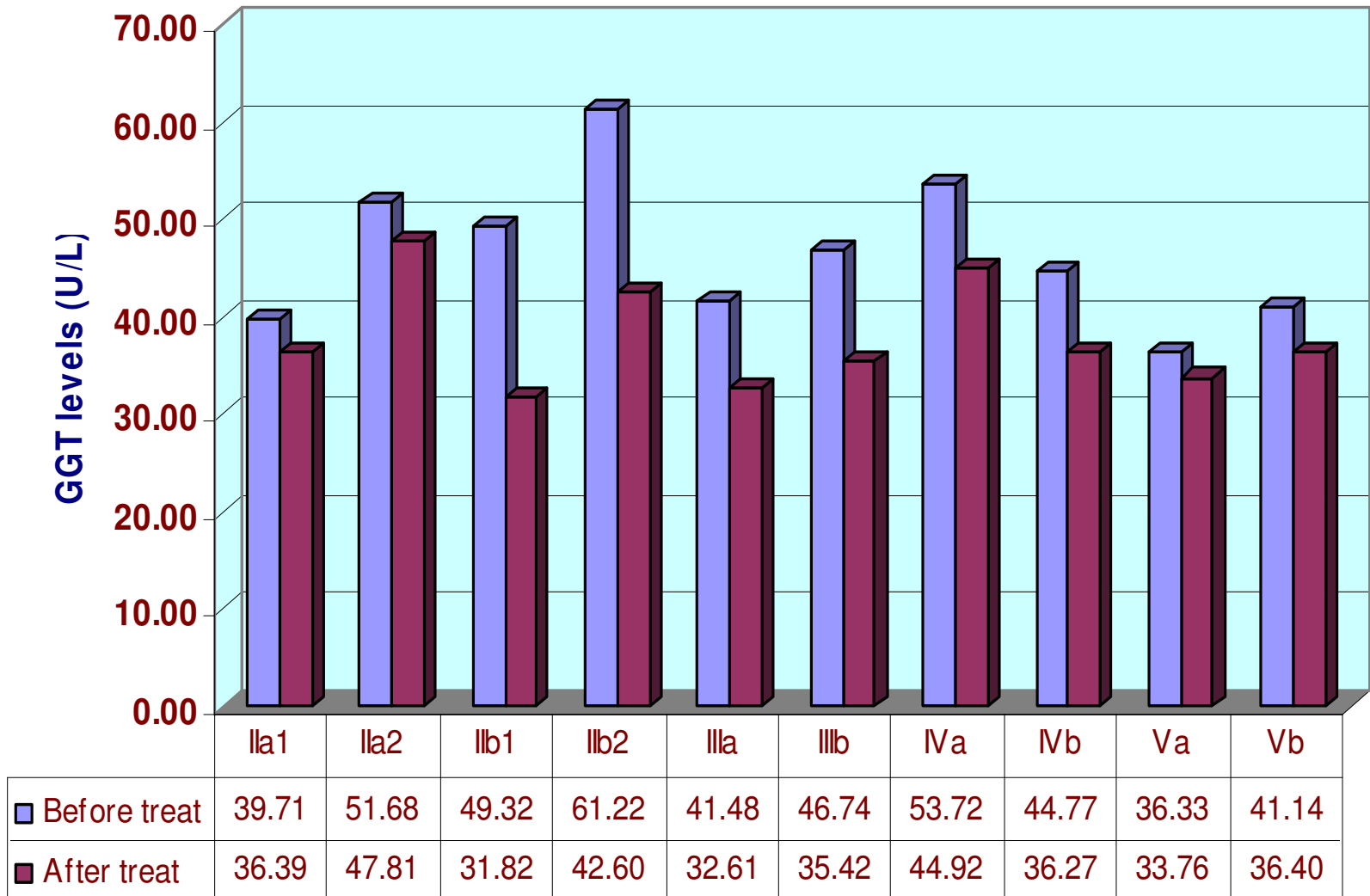
Mean serum cholesterol levels (mg/dL)



Mean serum AST levels (U/L)



Mean serum GGT levels (U/L)

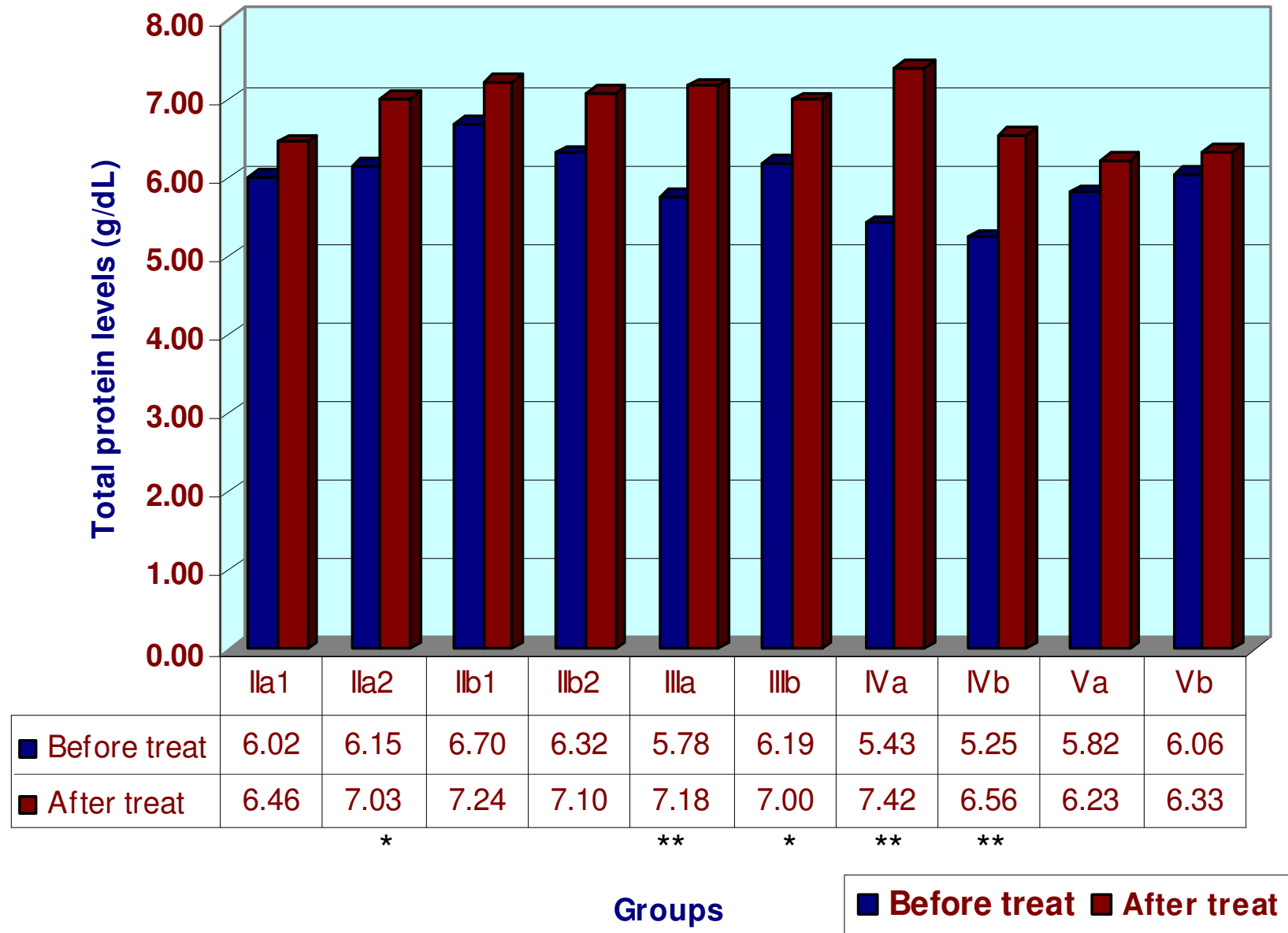


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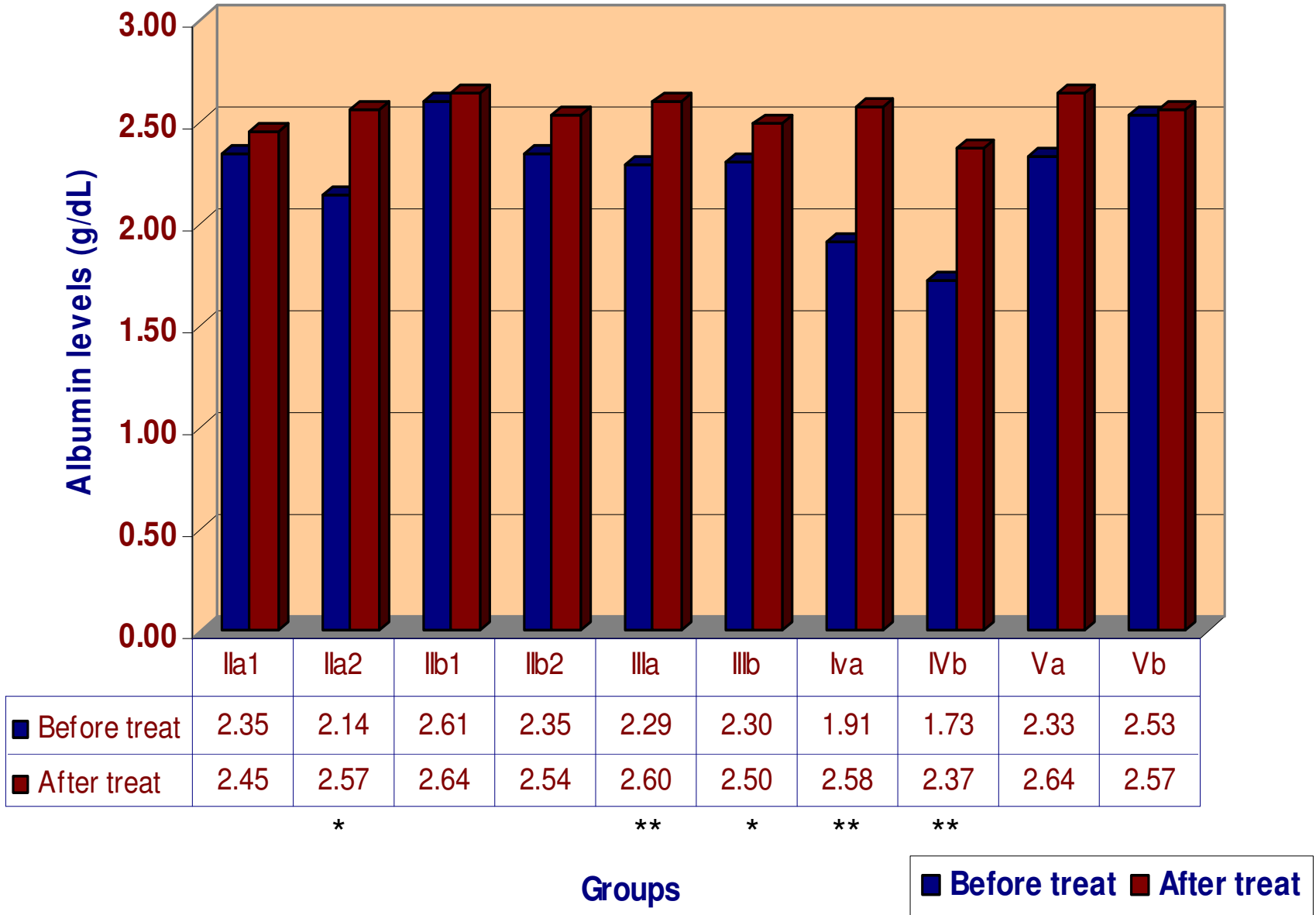
Groups

■ Before treat ■ After treat

Mean serum Total protein levels (g/dL)



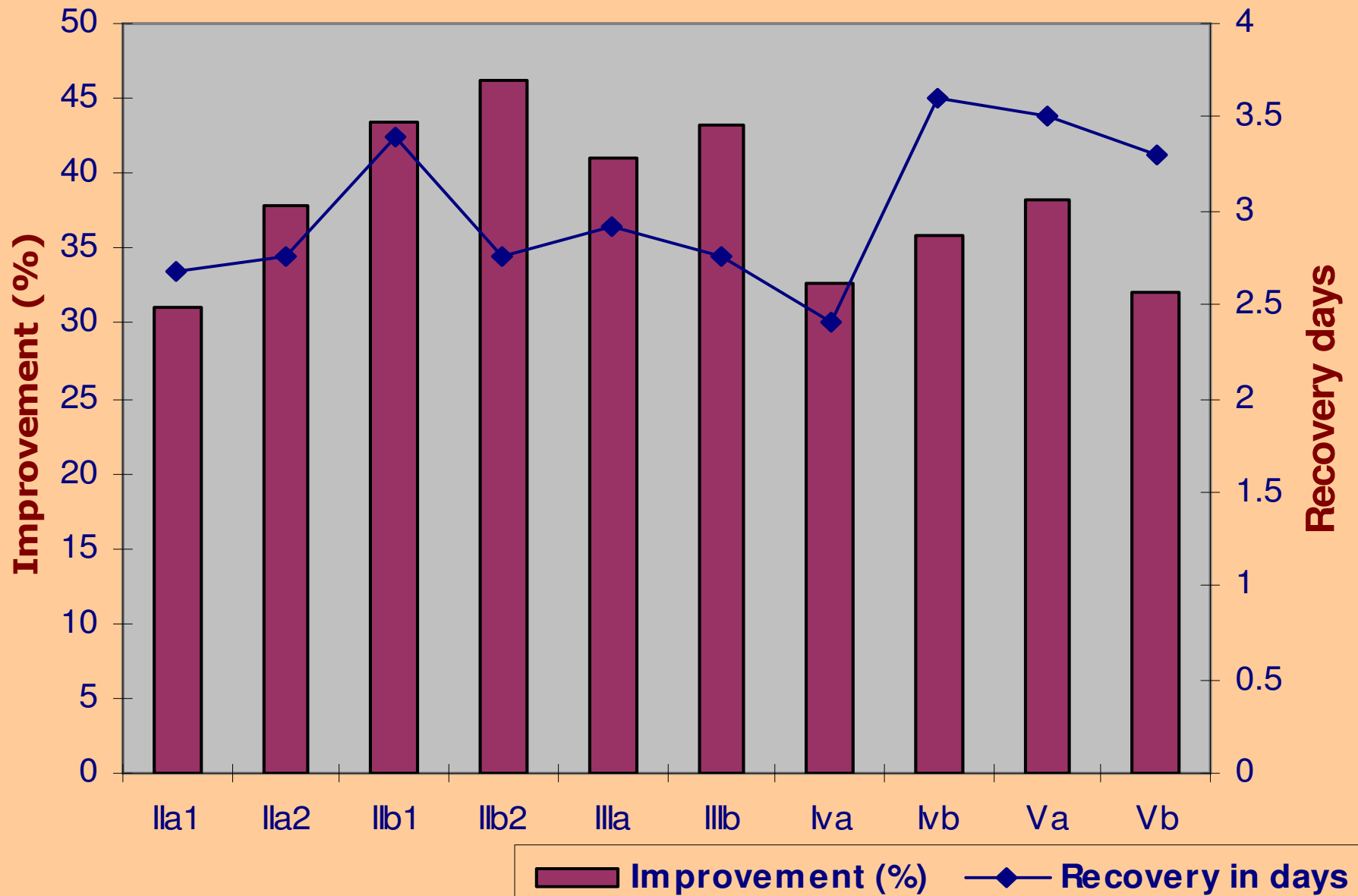
Mean serum Albumin levels (g/dL)



Rumen fluid analysis of buffaloes before and after treatment among Groups Va and Vb

S. No.	Parameter	Group Va		Group Vb	
		Before treatment	After treatment	Before treatment	After treatment
1	Colour	Dark brown	Brownish green	Dark brown	Brownish green
2	Odour	Stale	Aromatic	Stale	Aromatic
3	Consistency	Watery	Slightly viscous	Watery	Slightly viscous
4	pH	8.00 ± 0.00	6.80 ± 0.13	8.00 ± 0.00	6.90 ± 0.10
5	SAT (minutes)	7.55 ± 0.37	6.93 ± 0.10	7.46 ± 0.61	6.96 ± 0.50
6	MBRT (minutes)	5.05 ± 0.01	3.02 ± 0.32	5.04 ± 0.46	3.05 ± 0.65
7	Protozoan activity	++	+++	++	+++
8	Protozoan concentration/LPF	+	+++	+	+++

Therapeutic efficacy based on improvement percentage in milk yield and recovery



Therapeutic efficacy of different treatments

S. No.	Parameter	Comparative Means		
		Healthy	T1	T2
1.	Serum calcium	9.03 ^a	8.67 ^b (IIa ₁)	9.02 ^a (IIa ₂)
		9.03 ^a	9.03 ^a (IVa)	8.09 ^b (IVb)
		9.03 ^a	8.66 ^{ab} (Va)	8.48 ^b (Vb)
2.	Serum glucose	54.97 ^a	50.18 ^b (IIb ₁)	54.73 ^a (IIb ₂)
		54.97 ^b	56.75 ^b (IVa)	60.62 ^a (IVb)
		54.97 ^a	54.42 ^a (Va)	44.97 ^b (Vb)
3.	Serum AST	113.71	134.87 (IIIa)	110.98 (IIIb)
		113.71	96.52 (IVa)	117.42 (IVb)
4.	Serum GGT	37.13	32.61 (IIIa)	35.42 (IIIb)
		37.13	44.92 (IVa)	36.27 (IVb)

* Means with different alphabets as superscripts differ significantly (P<0.05)

CONCLUSIONS

- ~ Inadequate supply of nutrients to the body due to ruminal disorders is the cause of insufficiency of the liver.**
- ~ The treatment of PPI in buffaloes,**
 - Hepatoprotective and liver stimulant drugs**
 - i/v glucose,**
 - Oral calcium preparation and**
 - Combination of probiotics and prebiotics**
- ~ Urine analysis on day 15, 30, 45 and 60 postpartum for bile pigments is recommended for early detection and prevention of PPI in buffaloes.**

Thank you

